

# SERVICE MANUAL

COLOR TELEVISION

- This Service Manual is the "Revision Publishing" and replaces "Simple Manual" (S/M Code No. 09-003-429-9T1).
- This Service Manual does not include "DISASSEMBLY INSTRUCTIONS" and "ADJUSTMENT". These items will be issued in the next Supplement.

## SPECIFICATIONS

<b>Tuner System</b>	Frequency synthesized tuner
<b>TV System</b>	PAL (B/G, D, K) SECAM (B/G, D/K, K1) NTSC
<b>Channel Coverage</b>	VHF: E2 to E12, R1 to R12 UHF: 21 to 69 CATV: S1 to S41
<b>Program Memory</b>	100 TV stations
<b>Antenna Input</b>	75 ohms, unbalanced
<b>Picture Tube</b>	21"
<b>Screen Size</b>	406 (W) X 305 (H) mm (16 x 12 <sup>1</sup> / <sub>8</sub> in.) 508 mm (diagonal) (20 in.)
<b>Video Input/Output</b>	1 Vp-p 75 ohms
<b>Audio Input</b>	-8dBs., more than 33 kohms
<b>Audio Output</b>	-8dBs., less than 2.2 kohms
<b>Speaker</b>	60 X 120 mm : (2 <sup>3</sup> / <sub>8</sub> X 4 <sup>3</sup> / <sub>4</sub> in.)
<b>Operating Voltage</b>	110-240 V AC, 50/60 Hz
<b>Power Consumption</b>	85 W (Standby mode: 13.5 W)
<b>Phones Jack</b>	Stereo-mini jack
<b>Operating Temperature</b>	5 °C – 40 °C
<b>Operating Humidity</b>	35 % – 80 %
<b>Dimensions</b>	610 (W) X 440 (H) X 480 (D) mm (24 <sup>1</sup> / <sub>8</sub> x 17 <sup>3</sup> / <sub>8</sub> x 19 in.)
<b>Weight</b>	21.4kg (47.08 lbs.)

- Design and specifications are subject to change without notice.
- The word "BBE" and the "BBE symbol" are trademarks of BBE Sound, Inc.  
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## ACCESSORIES / PACKAGE LIST

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
1	86-LB3-610-010		ANT ASSY, TV 5 SEC. ( PAL)
2	8A-JBK-901-010		IB, KE(T) -A2115
3	8Z-JB4-954-010		RC UNIT, RC-ZVT04

## NOTICES BEFORE REPAIRING

To make the best use of this equipment, make sure to obey the following items when repairing (or mending).

1. Do not damage or melt the tunicate of the leading wire on the AC1 side, including the power supply cord.
2. Do not soil or stain the letters on the spec. inscription plates, notice labels, fuse labels, etc.
3. When repairing the part extracted from the conducted side of the board pattern, fix it firmly with applying bond to the pattern and the part.
4. Restore the following items after repairing.
  - 1) Conditions of soldering of the wires (especially, the distance on the AC1 side).
  - 2) Conditions of wiring, bundling of wires, etc.
  - 3) Types of the wires.
  - 4) Attachment conditions of all types of the insulation.
5. After repairing, always measure the insulation resistance and perform the voltage-withstand test (See Fig-1).
  - 1) The insulation resistance must be 6.0 to 10 MΩ when applying 500V per second.
  - 2) In the voltage withstand test, apply 1.0 KV for 1 minute and check that the GO lamp lights.

- \* Breaking current set to 10 mA.
- \* Connect the safety checker as shown in Fig-1, then measure the resistance and perform the test.
- \* Do not touch the equipment during testing.
- \* For details of the safety checker, refer to the supplied Operation manual.

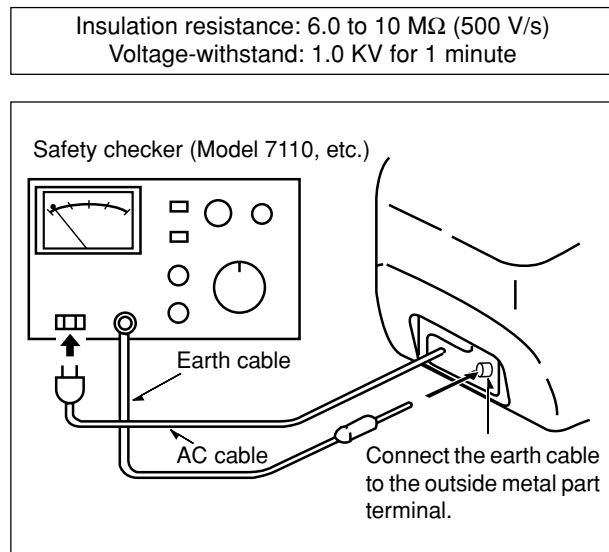


Fig-1

When servicing and checking on the TV, note the followings.

1. Keep the notices.

As for the places which need special attentions, they are indicated with labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.
2. Avoid an electric shock.

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.
3. Use the designated parts.

The parts in this equipment have the specific characteristics of incombustibility and withstand voltage for safety.  
Therefore, use a part which has the same character as the replaced part. Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts with a  $\triangle$  mark, the designated parts must be used.
4. Put parts and wires in the original position after assembling or wiring.

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled so that these parts do not make contact with the printed board. The inside wiring is designed
- not to get close to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.
5. Take care of the cathode-ray tube.

By setting an explosion-proof cathode-ray tube in this equipment, safety is secured against implosion. However, when removing it or servicing from the back, it gives out shock that is dangerous. Take enough care to deal with it.
6. Avoid an X-ray.

Safety is secured against an X-ray by giving considerations to the cathode-ray tube and the high voltage peripheral circuit, etc. Therefore, when repairing the high voltage peripheral circuit, use the designated parts and do not change the circuit. Repairing, except indicates, causes rising of high voltage, and the cathode-ray tube emits an X-ray.
7. Perform a safety check after servicing.

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are deteriorated portions around the places serviced.

### $\triangle$ Safety Components Symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to confirm to special Safety Specifications.  
Therefore, when replacing a component with this symbol make absolutely sure that you use a designated part.

# ELECTRICAL MAIN PARTS LIST

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION	REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
IC				C101	87-010-404-080		CAP, ELECT 4.7-50V
	8A-JEH-651-010	IC,TMP87CP38N		C102	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A21-133-080	IC,BMR-0101D		C103	87-010-384-080		CAP, ELECT 100-25V
	87-A91-538-010	RCR UNIT,SBX1981-72P		C104	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A21-433-010	IC,KS24C041I		C105	87-010-384-080		CAP, E 100-25 SME
	87-A21-165-010	IC,TB1240AN		C106	87-A10-207-080		CAP,TCS 0.01-50KBUP050
	87-A21-166-010	IC,TA1275AZ		C107	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A21-259-010	IC,MM1454XD		C108	87-018-132-080		CAP, CER 2200P-16V
	87-A21-345-010	IC,NJM2150		C110	87-018-132-080		CAP, CER 2200P-16V
	87-A20-312-010	IC,M62420SP		C113	87-010-260-080		CAP, ELECT 47-25V
	87-A21-299-010	IC,LA6458SLL		C114	87-018-113-080		CAP, CER 33P-50V
	87-A21-169-010	IC,MM1124B		C115	87-018-119-080		CAP, CER 100P-50V
	87-A21-283-010	IC,AN5277		C120	87-010-405-080		CAP, ELECT 10-50V
	87-070-237-010	IC,LA7832		C121	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A21-344-010	IC,STR-F6656		C122	87-010-260-080		CAP, ELECT 47-25V
	87-020-903-010	IC,NJM7805FA		C124	87-010-401-080		CAP, ELECT 1-50V
	87-A20-389-010	IC,NJM7809FA		C125	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-027-666-010	IC,TC4052BP		C126	87-010-544-080		CAP, ELECT 0.1-50V
				C127	87-018-119-080		CAP, CER 100P-50V
				C128	87-018-134-080		CAPACITOR,TC-U 0.01-16
TRANSISTOR				C129	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A30-066-080	TR,2SA1175FE		C130	87-010-405-080		CAP, ELECT 10-50V
	87-A30-090-080	FET,2SK2541		C131	87-010-405-080		CAP, ELECT 10-50V
	87-A30-091-080	FET,2SJ460		C132	87-010-260-080		CAP, ELECT 47-25V
	89-337-794-580	TR,2SC3779 D/E		C134	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A30-065-080	TR,2SC2785FE		C135	87-018-132-080		CAP, TC U 2200P-16V
	89-109-504-080	TR,2SA950Y		C136	87-018-132-080		CAP, TC U 2200P-16V
	87-026-218-080	TR,DTC144ES (0.2W)		C301	87-010-545-080		CAP, ELECT 0.22-50V
	87-A30-121-080	TR,DTC 323 TS		C302	87-018-132-080		CAP, CER 2200P-16V
	87-A30-005-010	TR,2SC2688M/L		C303	87-018-148-080		CAP,TC-U 12P-50 CH
	87-A30-095-010	TR,2SD2333LS		C307	87-018-134-080		CAPACITOR,TC-U 0.01-16
	89-334-674-580	TR,2SC3467 D/E		C308	87-010-385-080		CAP, ELECT 220-25 M
	87-A30-041-110	TR,SE115N		C309	87-018-147-080		CAP,TC-U 10P-50 CH
	89-110-155-080	TR,2SA1015GR		C310	87-018-147-080		CAP,TC-U 10P-50 CH
				C311	87-018-147-080		CAP,TC-U 10P-50 CH
DIODE				C312	87-010-404-080		CAP, ELECT 4.7-50V
	87-070-345-080	DIODE,IN4148		C313	87-018-119-080		CAP, CER 100P-50V
	87-A40-347-080	ZENER MTZJ2.2B		C314	87-010-401-080		CAP, ELECT 1-50V
	87-070-444-080	ZENER,HZS33-1		C315	87-018-196-080		CAP, CER 1500P-16V
	87-A40-235-080	ZENER,MTZJ9.1C		C316	87-010-400-080		CAP, ELECT 0.47-50V
	87-A40-350-080	ZENER,MTZJ 4.7C		C317	87-010-381-080		CAP, ELECT 330-16 M
	87-070-092-080	DIODE,S5566B		C318	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A40-286-080	DIODE,RGP10JE-5025		C319	87-010-400-080		CAP, ELECT 0.47-50V
	87-A40-794-080	DIODE,EGP20G		C320	87-010-384-080		CAP, ELECT 100-25V
	87-017-654-060	DIODE,GBU6J		C321	87-018-134-080		CAPACITOR,TC-U 0.01-16
	87-A40-509-080	ZENER,MTZJ6.8C		C323	87-018-209-080		CAP, CER 0.1-50V
	87-A40-450-090	DIODE,RU 1P		C324	87-018-209-080		CAP, CER 0.1-50V
	87-A40-354-090	DIODE,UF3GL-6251		C328	87-010-400-080		CAP, ELECT 0.47-50V
	87-A40-611-080	ZENER,MTZJ3.9B		C330	87-018-134-080		CAPACITOR,TC-U 0.01-16
				C333	87-018-134-080		CAPACITOR,TC-U 0.01-16
				C334	87-010-263-080		CAP, ELECT 100-10V
				C335	87-010-401-080		CAP, ELECT 1-50V
				C336	87-018-134-080		CAPACITOR,TC-U 0.01-16
				C337	87-010-401-080		CAP, ELECT 1-50V
				C338	87-010-401-080		CAP, ELECT 1-50V
MAIN C.B				C339	87-010-263-080		CAP, ELECT 100-10V
C1	87-018-151-080	CAP, TC U 20P-50V		C340	87-018-134-080		CAPACITOR,TC-U 0.01-16
C2	87-A11-073-080	CAP, TC U 22P-50V		C341	87-018-134-080		CAPACITOR,TC-U 0.01-16
C3	87-010-405-080	CAP, ELECT 10-50V		C344	87-010-263-080		CAP, ELECT 100-10V
C4	87-018-134-080	CAPACITOR,TC-U 0.01-16		C501	87-018-195-080		CAP, CER 1200P-16V
C5	87-010-263-080	CAP, ELECT 100-10 M		C502	87-018-115-080		CAP, CER 47P-50V
C6	87-018-119-080	CAP, CER 100P-50V		C503	87-010-247-080		CAP, ELECT 100-50V
C7	87-010-405-080	CAP, ELECT 10-50V		C509	87-010-405-080		CAP, ELECT 10-50V
C8	87-010-405-080	CAP, ELECT 10-50V		C510	87-010-401-080		CAP, ELECT 1-50V
C9	87-018-134-080	CAPACITOR,TC-U 0.01-16		C512	87-A10-011-090		CAP,E 2200-25 SMG
C10	87-018-119-080	CAP, CER 100P-50V		C513	87-018-127-080		CAP, CER 470P-50V
C11	87-018-119-080	CAP, CER 100P-50V		C601	87-A10-406-010		CAP,CER 270P-2K K BN DE
C13	87-010-405-080	CAP, ELECT 10-50V		C603	87-A12-023-080		CAP,E 10-250 M SME
C14	87-018-129-080	CAP,TC-U 680P-50 K B		C606	87-016-515-080		CAP,CER 1000P-1K B
C15	87-018-149-080	CAP,TC-U 15P-50 CH		C607	87-010-397-090		CAP,E 1000-35 SME
C16	87-018-149-080	CAP,TC-U 15P-50 CH					
C17	87-010-404-080	CAP, ELECT 4.7-50V					

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION	REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
C609	87-010-386-080		CAP,E330-25 SME	D801	87-A90-965-010		VRIS,TNR15G471K
C610	87-016-217-080		CAP,E 4.7-160	△ F801	87-035-458-010		FUSE,4A 250V T W/C
C611	87-A10-043-010		CAP,PP 0.56-200 PH	FB1	87-003-320-080		F-BEAD,FBR07HA121NB
C613	87-A10-625-090		CAP,M/P 0.0082-1250 J	FB501	87-003-320-080		F-BEAD,FBR07HA121NB
C614	87-012-396-090		CAP,CER 820P-2K K BN DE	FB601	87-003-320-080		F-BEAD,FBR07HA121NB
△ C616	87-018-132-080		CAP, CER 2200P-16V	FB801	87-003-320-080		F-BEAD,FBR07HA121NB
△ C617	87-010-976-080		CAP,CER 1000P-500 B	FB802	87-003-320-080		F-BEAD,FBR07HA121NB
△ C618	87-010-974-080		CAP,CER 220P-500 B	FB805	87-003-320-080		F-BEAD,FBR07HA121NB
△ C801	87-A10-688-090		CAP,M/P 0.22-275 K (B81133)	FB806	87-003-320-080		F-BEAD,FBR07HA121NB
△ C802	87-A10-688-090		CAP,M/P 0.22-275 K (B81133)	△ FC801	87-033-213-080		CLAMP, FUSE
C805	87-012-370-010		CAP,CER 3300P-250NS	△ FC802	87-033-213-080		CLAMP, FUSE
C807	87-A10-646-090		CAP,E 220-400 SMH (25.4*40)	FR601	87-A00-063-060		RES, FUSE 2.2-1/2W J
C808	87-A10-684-010		CAP,CER 680P-2K K BN DE	FR602	87-A00-419-090		RES, FUSE 1-2W J
C809	87-018-131-080		CAP, CER 1000P-50V	FR603	87-029-150-090		RES, FUSE 3.9-2W J
C810	87-010-384-080		CAP, ELECT 100-25V	FR604	87-A00-055-060		RES, FUSE 2.2-2W J
C811	87-018-127-080		CAP, CER 470P-50V	FR606	87-A00-049-060		RES, FUSE 2.2K-1/2W J
C812	87-018-129-080		CAP, CER 680P-50V	HL9	84-LB3-216-010		HLDR,LED
C813	87-A10-626-090		CAP,M/P 0.01-1250 J	J901	87-A60-324-110		JACK,PIN 6P Y-W-R W/SW
C815	87-A11-779-090		CAP,M/P 1000P-1.6K J ECWH (VB)	J902	87-A61-021-010		JACK,PIN 3P W/SW YKC21-5734
C816	87-A10-867-090		CAP,CER 2200P-2K K R	J903	87-A60-858-010		JACK,3.5 BLK ST 2 SW
C817	87-A10-731-090		CAP,E 220-160 M KMF	JW807	87-018-134-080		CAP,TC U 0.01-16 N Y
C818	87-016-221-090		CAP,E 100-160 M TWSS	L1	87-003-147-080		COIL, 22UH
C822	87-A10-832-080		CAP,CER 1000P-1K	L2	87-003-152-080		COIL, 100UH
C823	87-010-398-090		CAP,E 2200-35V	L101	87-005-444-080		COIL 100UH,K
C824	87-A12-082-090		CAP,E 1000-35 SMG	L102	87-003-152-080		COIL, 100UH
C826	87-010-235-080		CAP,E 470-16 SME	L104	87-003-097-080		COIL,1.0UH K LAL02
C827	87-010-405-080		CAP, ELECT 10-50V	L106	87-003-282-080		COIL,12UH
C828	87-010-405-080		CAP, ELECT 10-50V	L111	87-003-145-080		COIL,8.2UH
C829	87-A10-469-080		CAP,CER 2200P-500 K B DD10	L112	87-003-149-080		COIL,47UH
C830	87-010-405-080		CAP, ELECT 10-50V	L114	87-A50-530-010		COIL,VCO38.0MHZ
C831	87-010-405-080		CAP, ELECT 10-50V	L301	87-005-444-080		COIL 100UH,K
C832	87-010-405-080		CAP, ELECT 10-50V	L302	87-005-474-080		COIL,12UH J FLR50
C833	87-010-405-080		CAP, ELECT 10-50V	L303	87-005-444-080		COIL 100UH,K
C834	87-010-382-080		CAP, E 22-25 SME	L601	87-A50-040-010		COIL,2.2MH
C835	87-010-384-080		CAP, E 100-25 SME	L602	88-JBJ-625-010		COIL,HLC-ELH5L4120N
C901	87-010-405-080		CAP, ELECT 10-50V	L801	87-A50-170-010		COIL,390UH RCH106
C902	87-010-401-080		CAP, ELECT 1-50V	△ LF801	87-JB8-651-010		FLTR,LINE SS24H-K15070
C903	87-010-401-080		CAP, ELECT 1-50V	△ PR801	87-A90-090-080		PROTECTOR,1.5A 491SERIES 60V
C904	87-010-381-080		CAP, ELECT 330-16V	△ PR803	87-A90-094-080		PROTECTOR,4A 491SERIES 60V
C905	87-010-405-080		CAP, ELECT 10-50V	△ PR804	87-A90-094-080		PROTECTOR,4A 491SERIES 60V
C906	87-010-405-080		CAP, ELECT 10-50V	△ PS801	87-A91-407-010		P-COUPLER,ON3171-R
C907	87-010-405-080		CAP, ELECT 10-50V	△ PS802	87-A91-407-010		P-COUPLER,ON3171-R
C908	87-010-401-080		CAP, ELECT 1-50V	△ PT801	8Z-JBA-621-010		PT,SW ZJB-KE-7 M
C909	87-010-401-080		CAP, ELECT 1-50V	R101	87-A00-164-090		RES,M/F 12K-2W J RSF(S)
C910	87-010-401-080		CAP, ELECT 1-50V	R123	87-010-260-080		CAP,E 47-25 M
C911	87-010-401-080		CAP, ELECT 1-50V	R511	87-025-119-090		RES,M/F 560-1W J
C912	87-010-260-080		CAP, ELECT 47-25 SME	R612	87-A00-225-090		RES,M/F 2.2K-5W J
C913	87-018-134-080		CAPACITOR,TC-U 0.01-16	R619	87-A00-200-090		RES,M/F 100-2W J
C914	87-018-134-080		CAPACITOR,TC-U 0.01-16	R802	87-A00-552-010		RES,CEM 1.0-10W J MPC722
C915	87-018-133-080		CAPACITOR,TC-U 4700P-16	R803	87-A00-552-010		RES,CEM 1.0-10W J MPC722
C916	87-018-133-080		CAPACITOR,TC-U 4700P-16	R804	87-A00-543-080		RES,SD 8.2M-1W J RCR60
CF202	87-008-578-080		FLTR,TPS6.5MB2	R807	87-A00-639-090		RES,CEM 0.15-5W K BPR
CF204	87-008-577-080		FLTR,TPS5.5MB2	R808	87-A00-573-090		RES,CEM 0.33-5W K BPR
CF207	87-008-575-080		FLTR,SFSH5.5MCB	R816	87-A00-170-090		RES,M/F 82K-3W J RSF(S)
CF208	87-008-576-080		FLTR,SFSH6.5MCB	R817	87-A00-223-090		RES,M/F 47K-2W J RSF(S)
CN1	87-099-407-010		CONN,7P EH V WHT	R827	87-A00-673-090		RES,M/F 82K-5W J RSS5L30
CN102	87-010-384-080		CAP, E 100-25 M SME	R830	87-A00-158-090		RES,M/F 15-2W J RSF(S)
CN601	87-099-675-010		CONN,5P V V	R936	87-A00-070-090		RES,M/F 220-1W J
CN602	87-A60-485-010		CONN,2P V LV GRA	R937	87-A00-070-090		RES,M/F 220-1W J
△ CN801	87-099-674-010		CONN,2P VA V	S1	87-A90-712-080		SW,TACT EVQ11L07K
△ CN802	82-481-649-010		CONN, 2P V VT-50P	S2	87-A90-712-080		SW,TACT EVQ11L07K
CN901	87-049-469-010		CONN,4P V	S3	87-A90-712-080		SW,TACT EVQ11L07K
CNA301	84-LB2-631-010		CONN ASSY,5P TN-4	S4	87-A90-712-080		SW,TACT EVQ11L07K
CNA801	8Z-JB9-663-010		CONN ASSY,8P V AU PW 200	S5	87-A90-712-080		SW,TACT EVQ11L07K
CNA802	8Z-JB4-658-010		CONN ASSY,5P MAIN-NK 20'/21'	S6	87-A90-712-080		SW,TACT EVQ11L07K
CNA900	8Z-JBX-602-010		CONN ASSY,4P SP 205-0.5	S501	87-A90-567-010		SW,LVR 4-1-3 EVQRAAL10
CNA901	8Z-JB9-662-010		CONN ASSY,6P V AU L/R 300	△ S801	87-A91-410-010		SW,AC PUSH 1-1-1 ESB92SH1B
CNA902	8Z-JB4-660-010		CONN ASSY,5P 401-481 AUDIO	SWF202	87-A90-337-010		FLTR,SAW OFW-K2959M
CNA903	8Z-JB9-661-010		CONN ASSY,10P MAIN-AUDIO	△ T601	8Z-JBR-605-010		FBT, HFT3607 (SAN) 21-C
D9	87-A40-422-010		LED,SLP-581D-51 Y-G/R	△ T602	84-LB3-651-010		TRANS,HD MS-101N

REF.NO.	PART NO.	KANRI NO.	DESCRIPTION
△ THP801	87-A90-759-010		POS-THMS,PTH451C272BF300N270
TU101	87-A91-495-010		TU UNIT, ENV59D58G3-38.0MHZ
X1	87-030-300-080		VIB,XTAL 8.00MHZ
X301	87-A70-054-080		VIB,XTAL 4.43MHZ AQC-1018

#### AUDIO C.B

C401	87-010-402-080		CAP, ELECT 2.2-50V
C402	87-010-260-080		CAP, ELECT 47-25V
C403	87-018-134-080		CAPACITOR,TC-U 0.01-16
C405	87-010-402-080		CAP, ELECT 2.2-50V
C406	87-010-405-080		CAP, ELECT 10-50V
C407	87-A11-148-080		CAP,TC U 0.1-50 Z F
C408	87-010-367-080		CAP,E 4.7-25 BP
C411	87-010-367-080		CAP,E 4.7-25 BP
C412	87-010-405-080		CAP, ELECT 10-50V
C413	87-A11-148-080		CAP,TC U 0.1-50 Z F
C414	87-010-405-080		CAP, ELECT 10-50V
C415	87-010-367-080		CAP,E 4.7-25 BP
C418	87-010-367-080		CAP,E 4.7-25 BP
C419	87-A11-148-080		CAP,TC U 0.1-50 Z F
C420	87-010-260-080		CAP, ELECT 47-25V
C421	87-010-260-080		CAP, ELECT 47-25V
C422	87-018-134-080		CAPACITOR,TC-U 0.01-16
C426	87-A11-148-080		CAP,TC U 0.1-50 Z F
C427	87-010-401-080		CAP, ELECT 1-50V
C428	87-018-134-080		CAPACITOR,TC-U 0.01-16
C429	87-010-263-080		CAP, ELECT 100-10V
C433	87-A11-148-080		CAP,TC U 0.1-50 Z F
C434	87-A11-148-080		CAP,TC U 0.1-50 Z F
C435	87-010-260-080		CAP, ELECT 47-25V
C436	87-018-119-080		CAP, CER 100P-50V
C437	87-018-119-080		CAP, CER 100P-50V
C438	87-010-367-080		CAP,E 4.7-25 BP
C440	87-A11-147-080		CAP,TC U 0.047-50 Z F
C442	87-A11-147-080		CAP,TC U 0.047-50 Z F
C445	87-010-367-080		CAP,E 4.7-25 BP
C446	87-010-101-080		CAP, ELECT 220-16
C447	87-A11-148-080		CAP,TC U 0.1-50 Z F
C467	87-010-367-080		CAP,E 4.7-25 BP
C470	87-010-112-080		CAP, ELECT 100-16V
C471	87-A11-148-080		CAP,TC U 0.1-50 Z F
C472	87-010-367-080		CAP,E 4.7-25 BP
C475	87-010-379-080		CAP, ELECT 22-16V
C476	87-010-400-080		CAP, ELECT 0.47-50V
C477	87-010-400-080		CAP, ELECT 0.47-50V
C478	87-010-401-080		CAP, ELECT 1-50V

REF.NO.	PART NO.	KANRI NO.	DESCRIPTION
C479	87-010-247-080		CAP, ELECT 100-50V
C480	87-010-388-080		CAP ELECT 1000-25V SME
C481	87-010-388-080		CAP ELECT 1000-25V SME
C482	87-010-401-080		CAP, ELECT 1-50V
C483	87-010-247-080		CAP, ELECT 100-50V
C484	87-A11-148-080		CAP,TC U 0.1-50 Z F
C493	87-010-112-080		CAP, ELECT 100-16V
C498	87-010-402-080		CAP, ELECT 2.2-50 SME
CN401	87-009-034-010		CONN,6P PH V
CN402	87-009-038-010		CONN,10P V WHT
CN403	87-099-408-010		CONN,8P EH V WHT
CN404	87-009-195-010		CONN,5P B5BEH
FR996	87-A00-084-090		RES,FUSE 1-1W J
FR997	87-A00-084-090		RES,FUSE 1-1W J
R401	87-025-381-080		RES,M/F 18K-1/6W F
R402	87-025-424-080		RES,M/F 10K 1/6W F
R404	87-025-380-080		RES,M/F 15K-1/6W F
R405	87-025-381-080		RES,M/F 18K-1/6W F

#### NK C.B

△ C551	87-010-976-080		CAP,CER 1000P-500 B
△ C552	87-012-397-010		CAP,CER 1000P-2K BN
C553	87-018-127-080		CAP,TC-U 470P-50
C554	87-018-127-080		CAP,TC-U 470P-50
C555	87-018-128-080		CAP,TC-U 560P-50 B
C556	87-010-405-080		CAP, ELECT 10-50V
C557	87-010-405-080		CAP, ELECT 10-50V
CN551	87-009-195-010		CONN,5P B5BEH
CN552	87-049-590-010		CONN,5P 8283 V WHT
CN553	87-A61-112-080		CONN,1P V BLU TP00704
CN554	87-A61-060-080		CONN,1P V RED TP00706
L551	87-005-444-080		COIL 100UH,K
R551	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
R552	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
R553	87-A00-165-090		RES,M/F 15K-2W J RSF(S)
S0552	86-LBR-670-010		SOCKET,CRT 9P HPS1521

#### KEY C.B

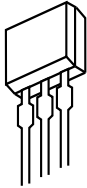
#### JOINT.F C.B

#### JOINT.R C.B

TRANSISTOR ILLUSTRATION



E C B  
2SA950  
2SA1015



S D G  
2SJ460  
2SK2541



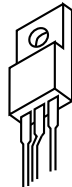
E C B  
2SC3467



E C B  
2SA1175  
2SC2785  
DTC144ES



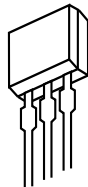
B C E  
2SD2333



1. SENSE  
2. COLLECTOR  
3. GROUND  
1 2 3  
SE115N



E C B  
2SC3779



E C B  
DTC323



E C B  
2SC2688

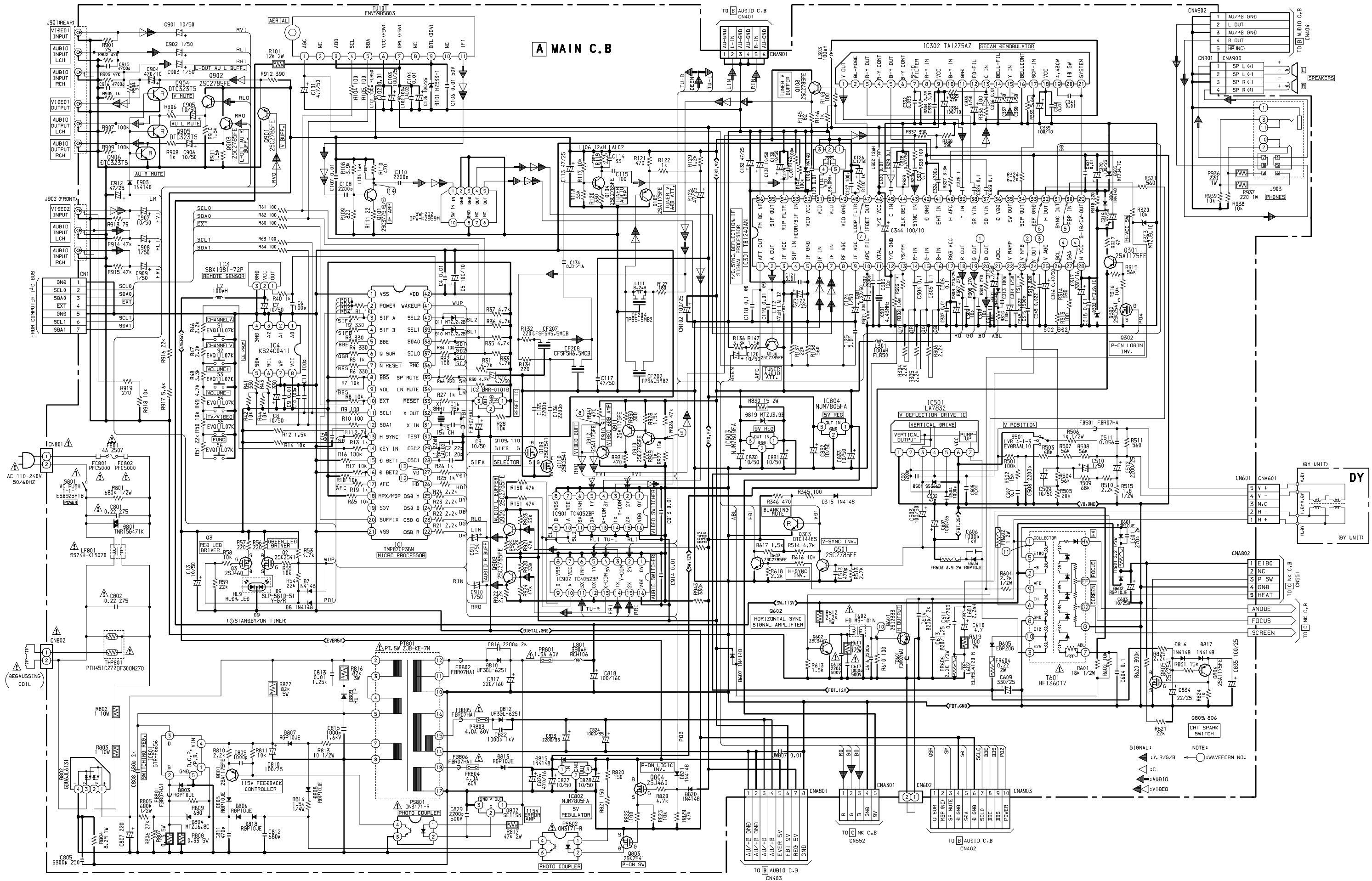


	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
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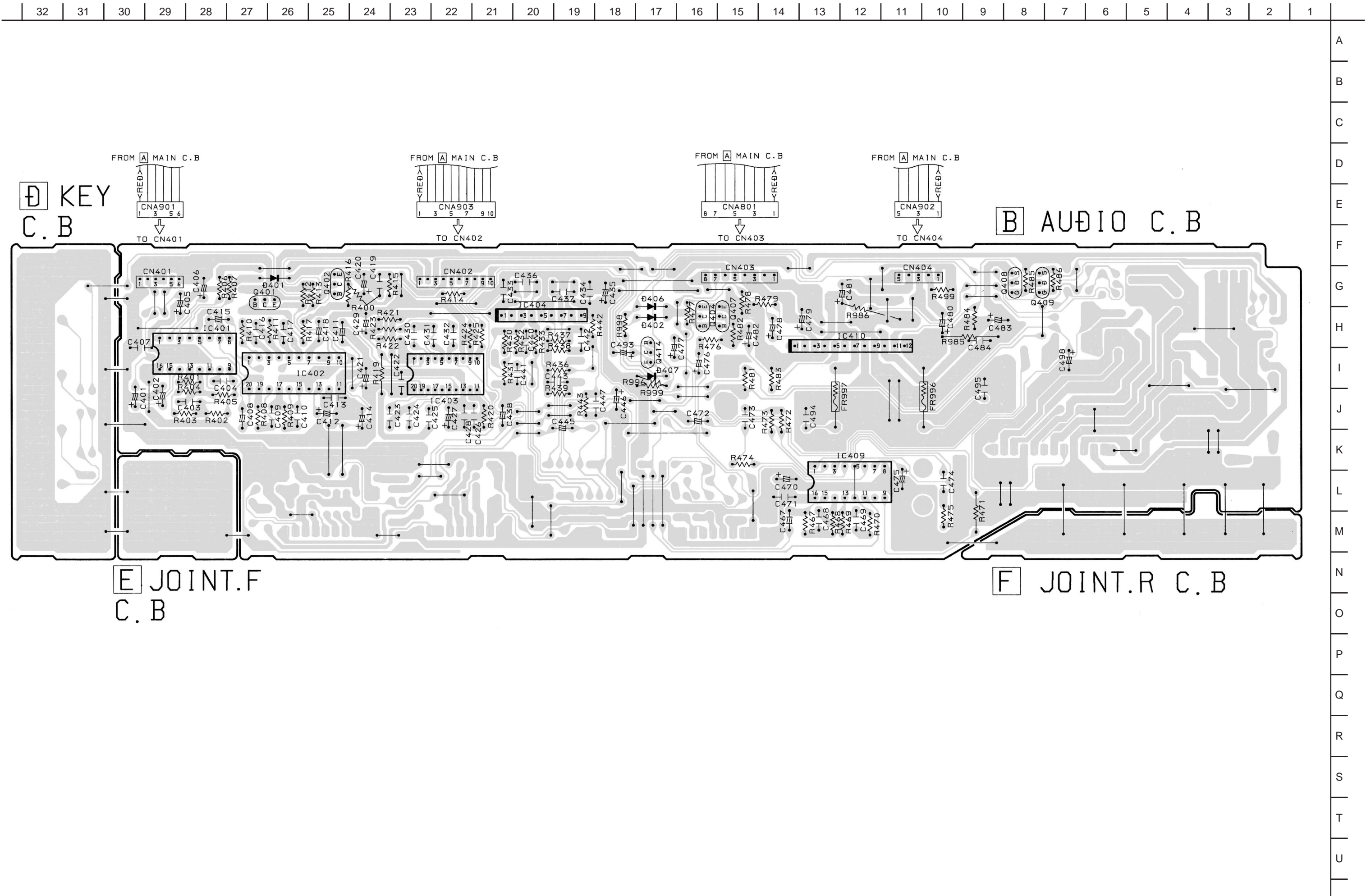




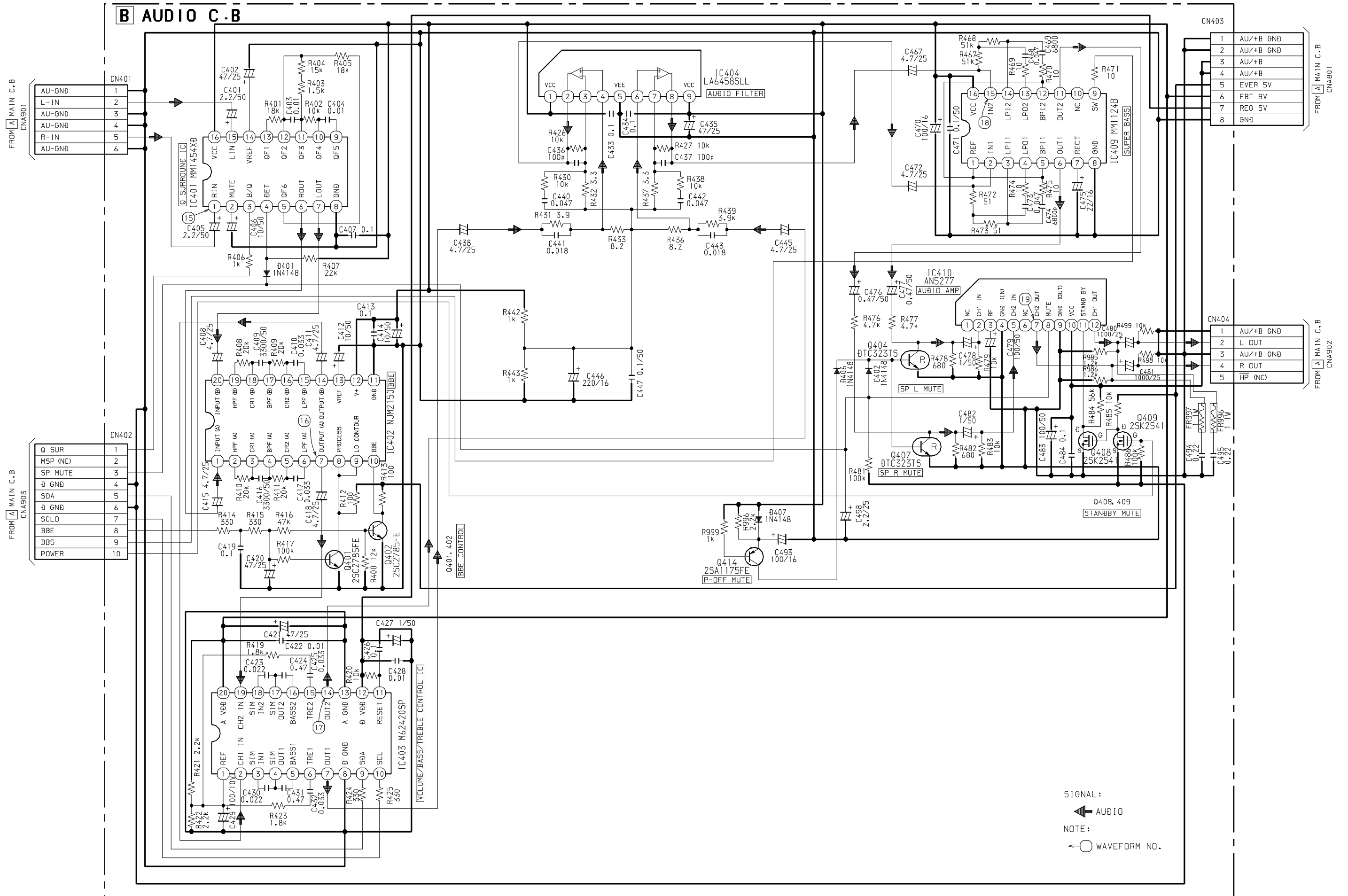
SCHEMATIC DIAGRAM - 1 (MAIN)

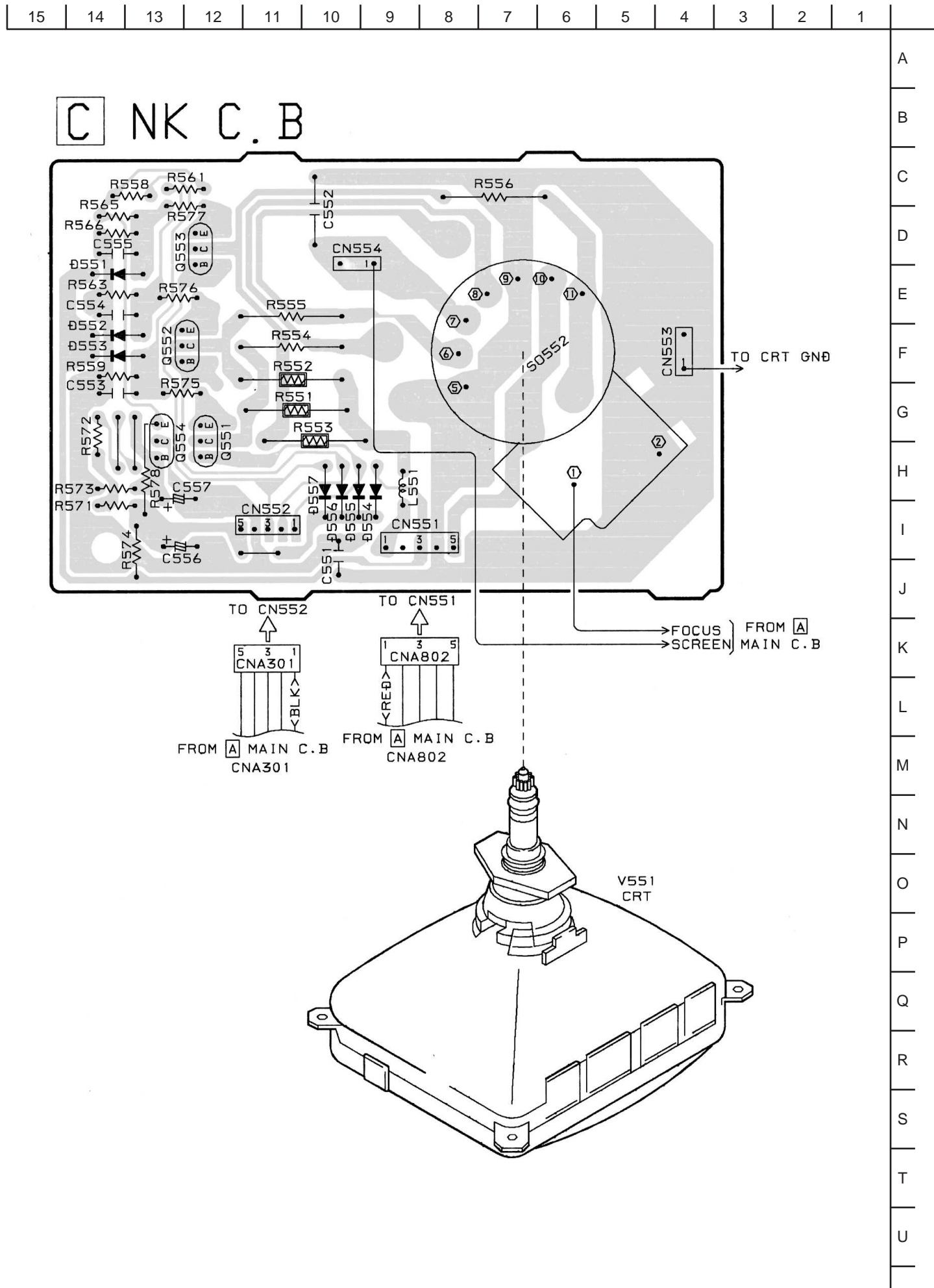


WIRING - 2 (AUDIO)

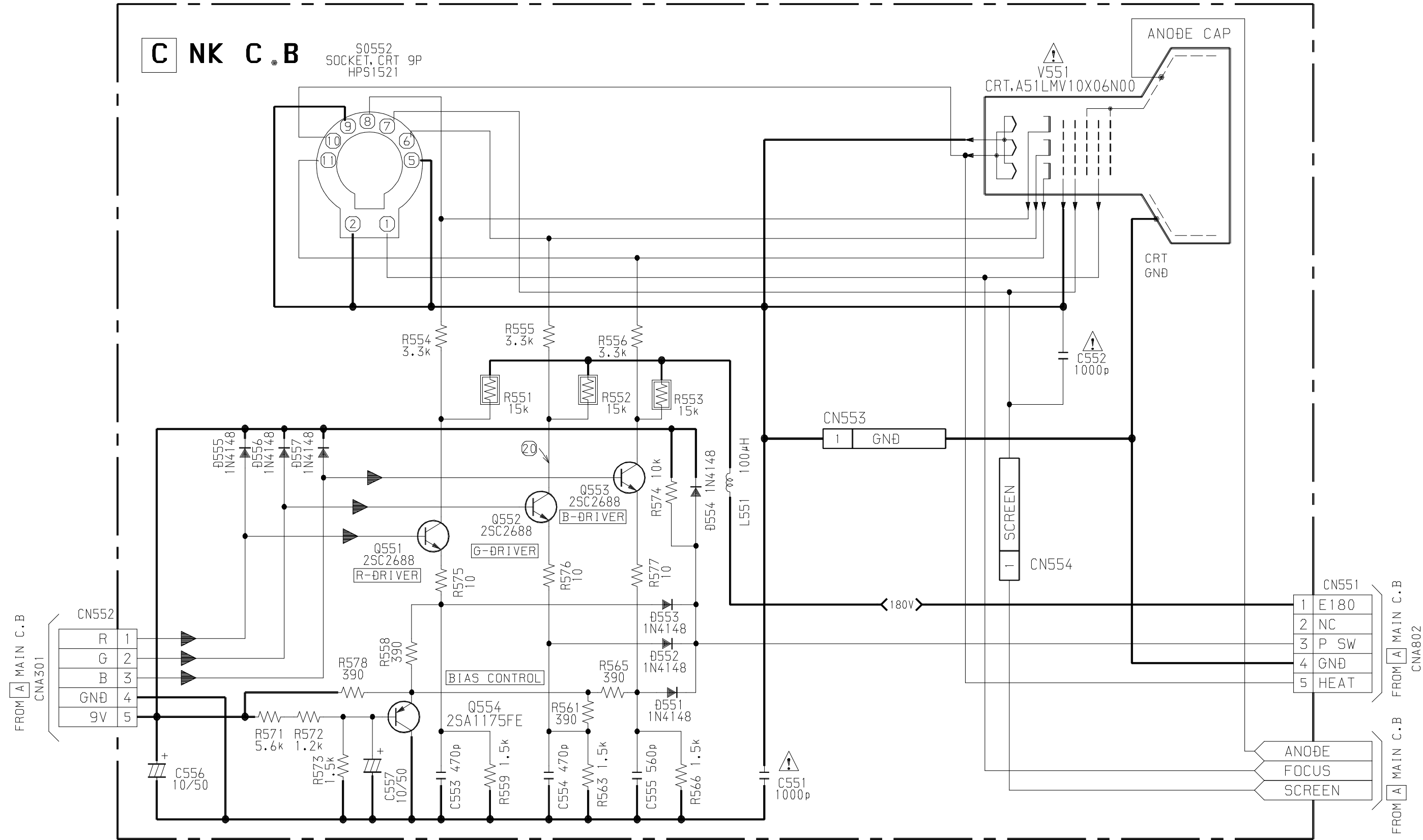


SCHEMATIC DIAGRAM - 2 (AUDIO)





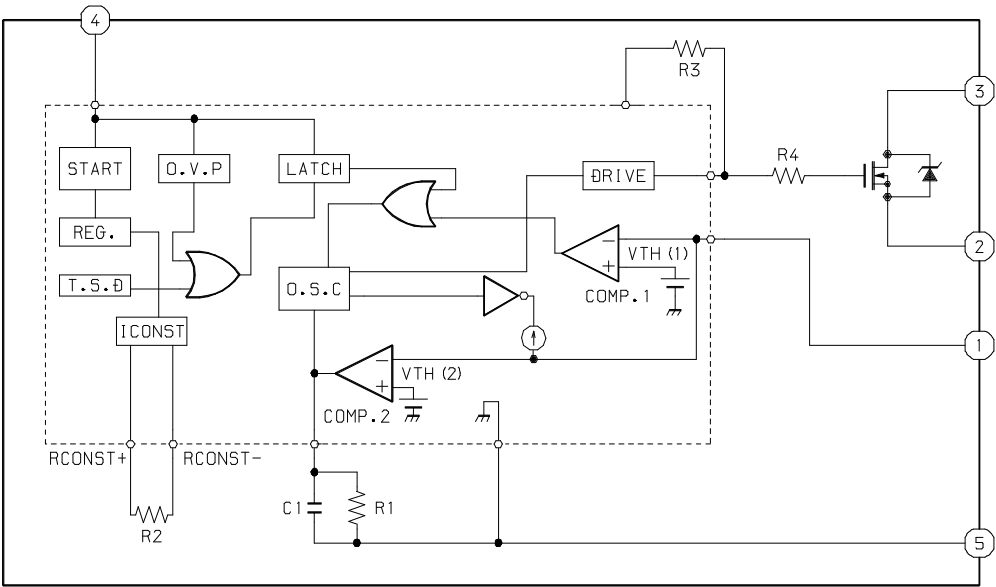
SCHEMATIC DIAGRAM - 3 (NK)



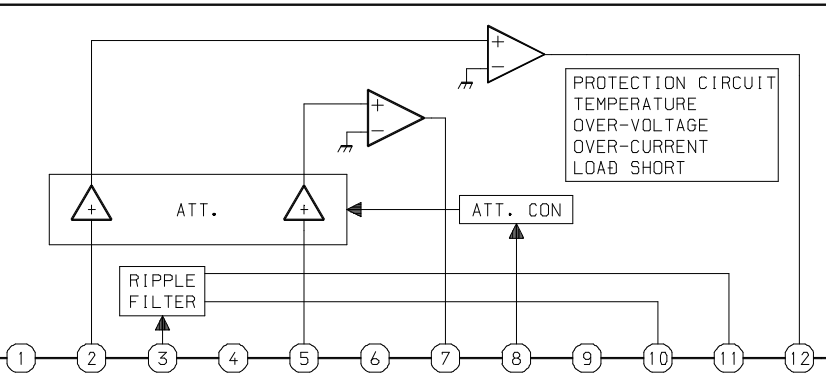
SIGNAL :  
◄ : R, G, B OUTPUT  
NOTE :  
◄○ : WAVEFORM NO.

IC BLOCK DIAGRAM

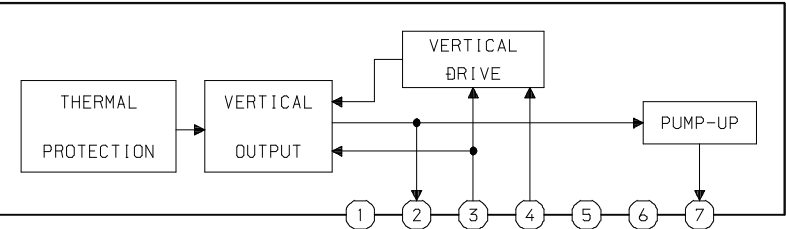
IC, STR-F6656



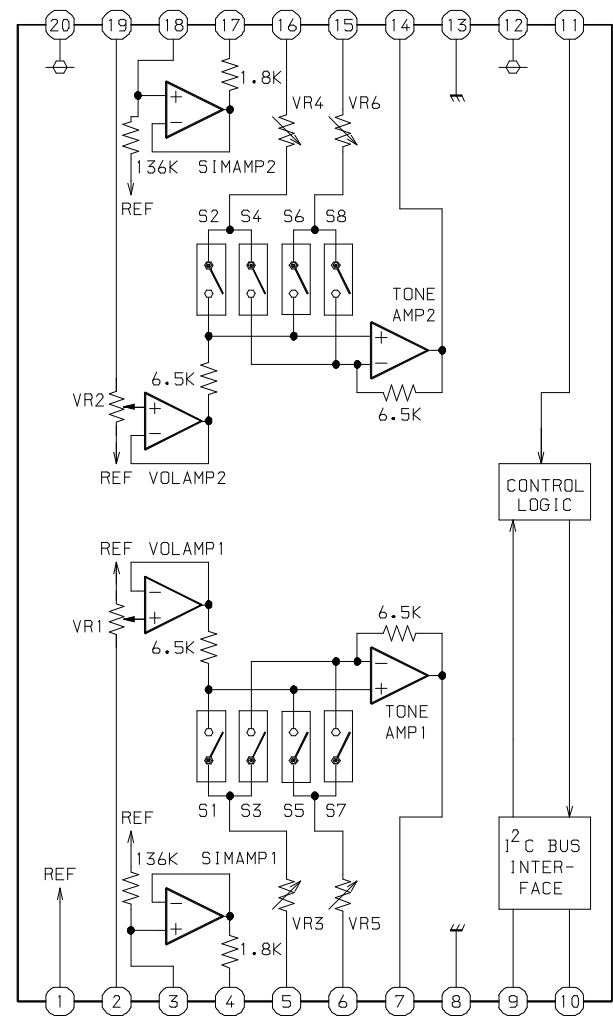
IC, AN5277



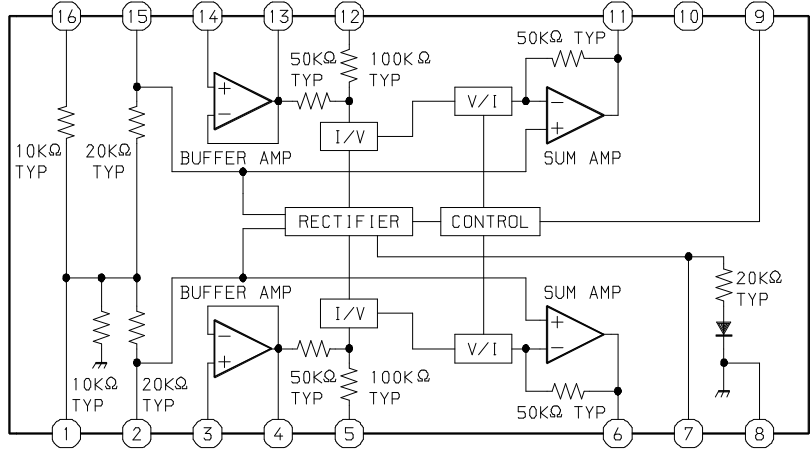
IC, LA7832



IC, M62420SP

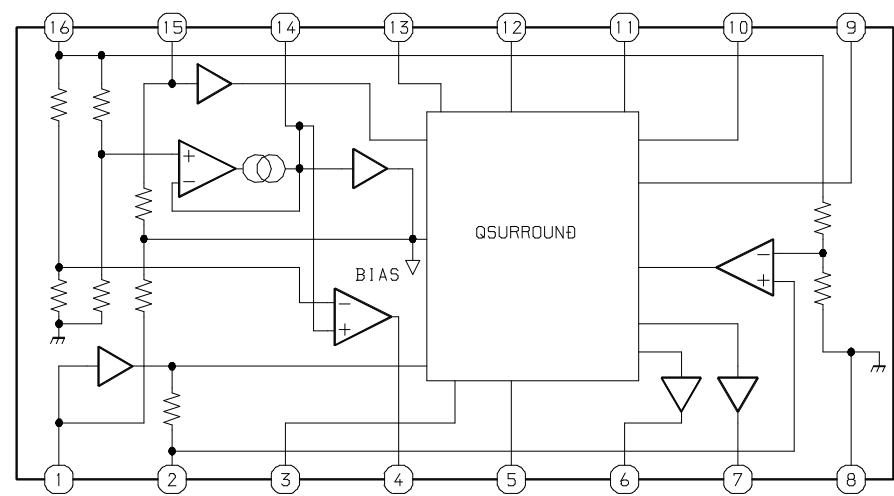


IC, MM1124B

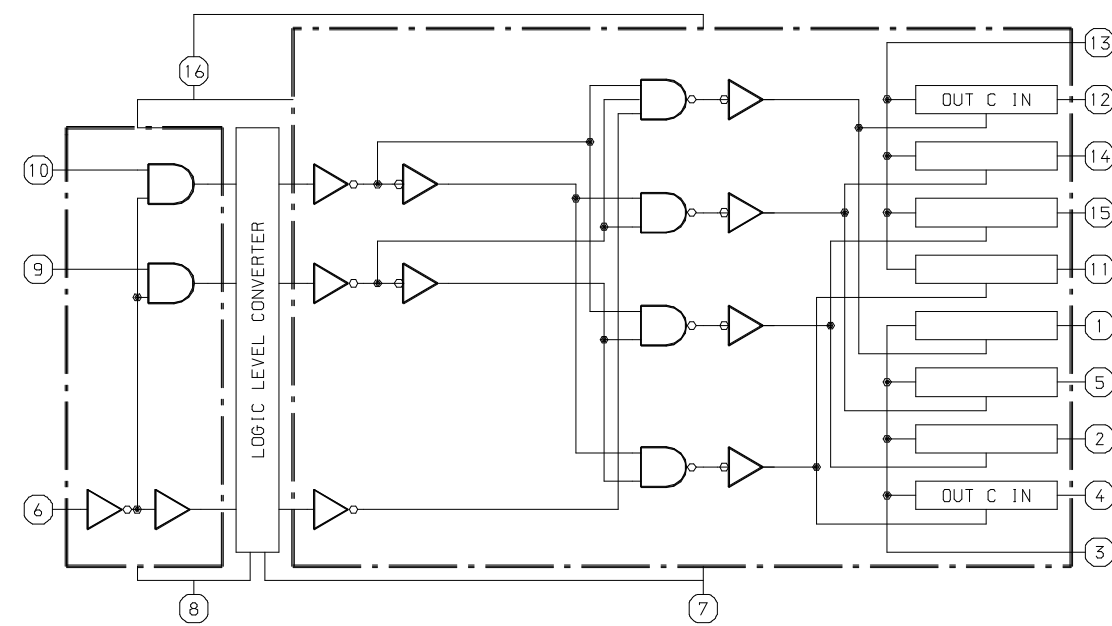




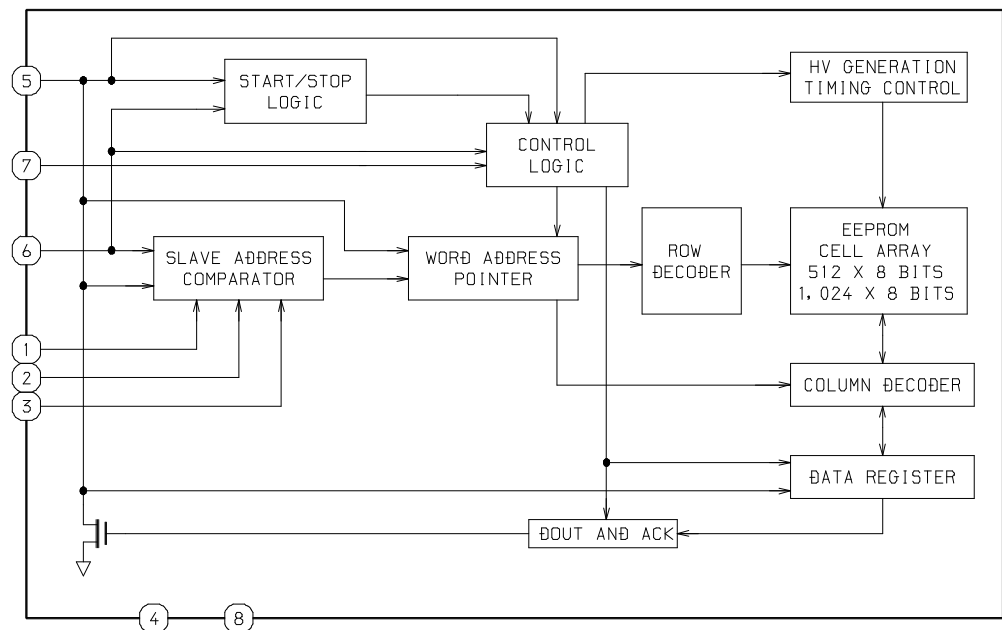
IC, MM1454XB



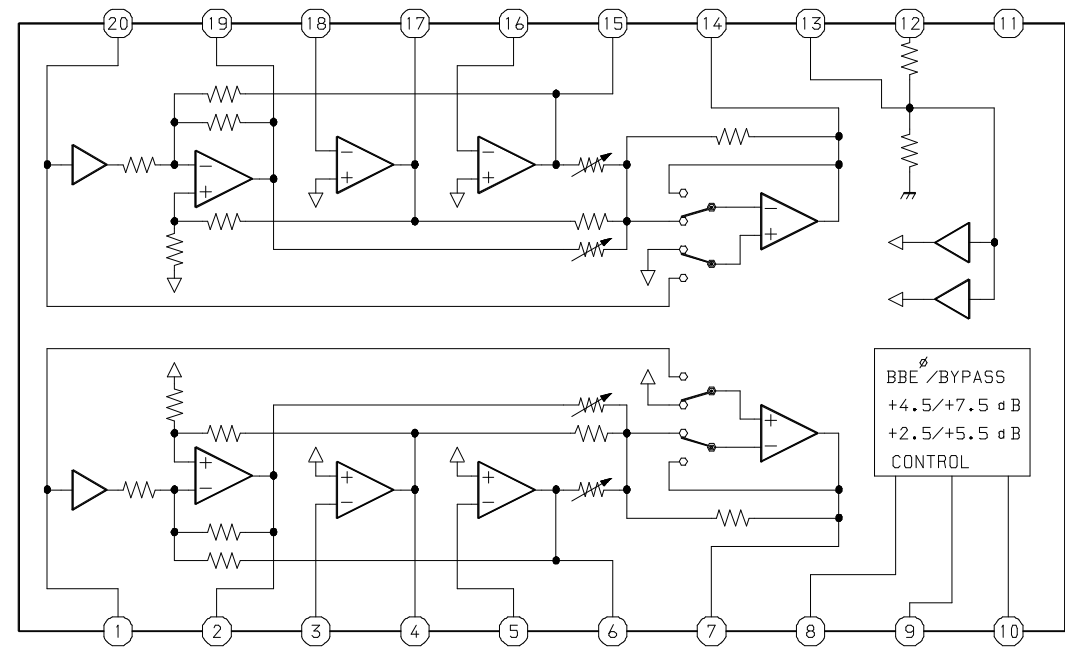
IC, TC4052BP



IC, KS24C0411



IC, NJM2150





## IC DESCRIPTION

IC, TMP87CP38N

Pin No.	Pin Name	I/O	Description
1	VSS	–	Connected to GND.
2	POWER	O	During standby mode, "H" level is inserted to switch off H deflection & high voltage.
3	SIF A	O	SOUND IF switch A.
4	SIF B	O	SOUND IF switch B.
5	BBE	O	BBE select.
6	Q SUR	O	Q SURROUND switch.
7	$\overline{\text{N RESET}}$	O	NICAM RESET ("L" = reset).
8	$\overline{\text{BBS}}$	O	BASS BOOST / S-WOOFER.
9	VOL	–	Not used.
10	$\overline{\text{EXT}}$	I	External bus switch.
11	SCL1	O	I <sup>2</sup> C bus CH1 clock.
12	SDA1	I/O	I <sup>2</sup> C bus CH1 data.
13	H SYNC	I	Sync signal input pin for detection.
14	KEY IN	I	Input key is detected by monitor.
15	D DET1	I	Power condition 1 (mid = good, low/high = bad).
16	D DET2	I	Power condition 2 (mid = good, low/high = bad).
17	AFC	I	AFT voltage input pin.
18	MPX/MSP	I	MPX detect / MSP key in. (Connected to VDD through a resistor)
19	SGV	O	Test signal output when test mode. (Not used)
20	SUFFIX	I	Feature select (initial) input.
21	VSS	–	Connected to GND.
22	OSD R	O	OSD red output.
23	OSD G	O	OSD green output.
24	OSD B	O	OSD blue output.
25	OSD Y	O	OSD blanking signal output.
26	$\overline{\text{HD}}$	I	OSD horizontal synchronised signal input.
27	$\overline{\text{VD}}$	I	OSD vertical synchronised signal input.
28	OSC1	–	Connected to OSC coil.
29	OSC2	–	Connected to OSCcoil.
30	TEST	–	Connected to GND.
31	X IN	I	8 MHz clock input.
32	X OUT	O	8 MHz clock output.
33	$\overline{\text{RESET}}$	I	Use to reset the micon when power up.
34	LN MUTE	O	"H" to mute the line out signal.
35	SP MUTE	O	"H" to mute the audio signal.
36	$\overline{\text{RMC}}$	I	Remote control signal is led to this pin.
37	SCL0	I	I <sup>2</sup> C bus CH2 clock.
38	SDA0	I/O	I <sup>2</sup> C bus CH2 data.
39	SEL1	O	Input select switch 1.
40	SEL2	O	Input select switch 2.
41	WAKEUP	O	LED (wake up timer).
42	VDD	–	5V supply.

## IC, TB1240AN

Pin No.	Pin Name	I/O	Description
1	AFT OUT	O	The terminal for AFT output and self-adjust output.
2	A OUT	O	Audio output pin.
3	IF VCC	–	VCC of PIF circuit.
4	SIF IN	I	SIF input pin. (Not used)
5	IF GND	–	GND of PIF circuit.
6	IF IN	I	IF signal input.
7	IF IN	I	IF signal input.
8	RF AGC	O	RF AGC output.
9	IF AGC	–	The terminal to be connected with an IF AGC filter.
10	APC FIL	–	APC filter of chroma for demodulation.
11	XTAL	I	4.43MHz crystal oscillator.
12	Y/C GND	–	GND of Y/C circuit.
13	YS/YM	I	The terminal for switching of analog RGB mode and fast half tone.
14	R-IN	I	Analog red signals input.
15	G-IN	I	Analog green signals input.
16	B-IN	I	Analog blue signals input.
17	RGB VCC	–	VCC of RGB circuit.
18	R OUT	O	R signals output.
19	G OUT	O	G signals output.
20	B OUT	O	B signals output.
21	ABCL	I	ABL/ACL control.
22	V RAMP	–	Connected with cap to make Vertical RAMP signal.
23	V NFB	I	Input of Vertical sawteeth signal feedback.
24	V OUT	O	Vertical drive signal output.
25	V AGC	–	Vertical AGC cap.
26	SCL	I	I <sup>2</sup> C bus clock input.
27	SDA	I/O	I <sup>2</sup> C bus data input/output.
28	H VCC	–	VCC of vertical circuit.
29	S-ID/CW OUT	I/O	SECAM ID input and PAL/NTSC ID output.
30	FBP IN	I	FBP input.
31	SYNC OUT	O	Composites sync output.
32	H OUT	O	Horizontal drive signal output.
33	DEF GND	–	GND of deflection circuit.
34	SCP OUT	O	Sand castle pulse (VD+HD+GP) output.
35	EW OUT	O	E-W output. (Not used)
36	D VDD	–	VDD of digital block.
37	SB YIN	I	B-Y signals input.
38	SR YIN	I	R-Y signals input.
39	Y IN	I	Y signal input.
40	H AFC	–	H.AFC filter.
41	EHT IN	I	The terminal for EHT. (Not used)
42	D GND	–	GND of digital block.

Pin No.	Pin Name	I/O	Description
43	SYNC IN	I	Input of the synchronous separation circuit.
44	BLK DET	–	The terminal to be connected with an Black Det filter.
45	C IN	I	Input of chroma signals.
46	Y/C VCC	–	VCC of Y/C circuit.
47	IFDET OUT	O	Composite video signal and SIF signal detected in IF circuit.
48	LOOP FLTR	–	Loop filter for IF PLL.
49	VCO GND	–	GND of VCO and SIF circuit.
50	VCO	–	The terminal connected with a tank coil for IF VCO.
51	VCO	–	The terminal connected with a tank coil for IF VCO.
52	VCO VCC	–	VCC of IF VCO and SIF.
53	HCOR/SIF IN	I	H.curve correction and SIF input.
54	RIP FLTR	–	Connected with cap to stabilize the performance of SIF injection-lock circuit.
55	SIF OUT	O	Output of 2nd SIF signal. (Not used)
56	FM DC NF	I	The terminal for FM DC negative feedback and AGC filter for L-SECAM.

#### IC, TA1275AZ

Pin No.	Pin Name	I/O	Description
1	Y OUT	O	The output pin for Y signal.
2	DL-MODE	O	The pin for controlling the Y processing mode: to VCC: 5.5MHz trap ; open: 5.5MHz trap + D.L ; to GND: DL. (Not used)
3	R-Y OUT	O	The output pin for demodulated R-Y signal.
4	R-Y CONT	I	The pin for controlling the black offset level. (Not used)
5	B-Y OUT	O	The output pin for demodulated B-Y signal.
6	B-Y CONT	I	The pin for controlling the black offset level. (Not used)
7	S-ID FILTER	I	The pin for connecting the SECAM ident filter capacitor.
8	R-Y IN	I	The input pin for external R-Y signal. (Not used)
9	VCC	–	The VCC pin for Y/C processing block.
10	B-Y IN	I	The input pin for external B-Y signal. (Not used)
11	GND	–	The GND pin.
12	F0-FIL	I	The pin for connecting a capacitor for automatic adjusting circuit.
13	C IN	I	The chroma signal input pin.
14	BELL-FIL	I	The pin for connecting a capacitor for the bell filter fo, 4.286MHz.
15	Y IN	I	The Y signal input pin.
16	BELLCONT	I	The pin for selecting the bell filter fo. fo + 70KHz: open ; fo + 35KHz:20k to GND ; fo: to GND. (Connected to GND).
17	SCP-IN	I	The pin to input the sand castle pulse, SCP.
18	VCC	–	VCC pin for logic block.
19	4.43 CW	I	The pin for input 4.43MHz of carrier wave for self adjustment circuit.
20	ID SW	I	The switch pin for selecting the ID detection mode. H + V: connected to VCC ; Auto search: opened ; H: connected to GND. (Not used.)
21	SYSTEM	I/O	The interface pin to the main processor.

## VOLTAGE CHART

REF NO.	S	D	G
Q2	0.2	5.1	1.0

REF NO.	S	D	G
Q3	5.1	1.2	4.1

REF NO.	E	C	B
Q101	1.2	0.5	8.9

REF NO.	E	C	B
Q104	1.6	9.0	2.2

REF NO.	E	C	B
Q105	3.6	0.0	2.9

REF NO.	E	C	B
Q106	3.6	9.0	4.2

REF NO.	E	C	B
Q108	2.9	9.0	3.6

REF NO.	S	D	G
Q109	0.0	0.8	0.0

REF NO.	S	D	G
Q110	0.0	0.0	5.1

REF NO.	E	C	B
Q301	11.3	11.2	10.6

REF NO.	S	D	G
Q302	0.0	0.0	4.7

REF NO.	E	C	B
Q303	0.0	0.3	4.5

REF NO.	E	C	B
Q401	0.2	2.3	0.2

REF NO.	E	C	B
Q402	0.2	3.2	0.1

REF NO.	E	C	B
Q404	0.2	0.2	0.3

REF NO.	E	C	B
Q407	0.2	0.2	0.0

REF NO.	S	D	G
Q408	0.0	11.1	0.2

REF NO.	S	D	G
Q409	0.2	0.2	4.8

REF NO.	E	C	B
Q414	8.9	0.0	9.1

REF NO.	E	C	B
Q501	0.0	4.5	0.2

REF NO.	E	C	B
Q554	2.0	0.0	1.3

REF NO.	E	C	B
Q551	2.8	139.0	3.0

REF NO.	E	C	B
Q552	2.7	141.1	3.0

REF NO.	E	C	B
Q553	2.6	145.1	2.9

REF NO.	E	C	B
Q601	0.0	-	*

REF NO.	E	C	B
Q602	0.0	63.2	0.4

REF NO.	E	C	B
Q603	0.0	4.2	0.0

REF NO.	E	C	B
Q801	15.2	0.6	14.7

\* Refer to Waveform no. 10

REF NO.	1	2	3
Q802	114.7	92.5	0.0

REF NO.	S	D	G
Q803	0.0	0.1	4.5

REF NO.	S	D	G
Q804	4.5	5.1	4.6

REF NO.	S	D	G
Q805	0.0	8.9	0.0

REF NO.	E	C	B
Q806	4.8	0.0	5.7

REF NO.	E	C	B
Q901	2.5	0.0	1.8

REF NO.	E	C	B
Q902	0.0	9.0	0.9

REF NO.	E	C	B
Q903	0.0	9.0	0.8

REF NO.	E	C	B
Q904	0.0	2.5	0.1

REF NO.	E	C	B
Q905	0.0	0.0	0.1

REF NO.	E	C	B
Q906	0.0	0.0	0.1

REF NO.	E	C	B
Q908	0.9	8.9	1.4

REF NO.	E	C	B
Q909	0.8	8.9	1.4

REF NO.	E	C	B
Q910	1.5	6.8	2.1

REF NO.	E	C	B
Q911	7.4	2.4	6.8

REF NO.	E	C	B
Q912	1.8	9.0	2.4

#### IC1, TMP87CP38N

PIN NO.	VOLT (V)
1	0.0
2~3	5.1
4	0.0
5	0.0
6	5.1
7~9	0.0
10~12	5.1
13	4.6
14	5.1
15	0.0
16	2.6
17	2.2
18	5.1
19	0.0
20	0.7
21~25	0.0
26	4.2
27	4.5
28~29	5.1
30	0.0
31	2.2
32	2.5
33	5.1
34~35	0.1
36	5.1
37~38	5.0
39~40	5.1
41	0.1
42	5.1

IC2, BMR-0101D

PIN NO.	VOLT (V)
1	5.1
2	0.0
3	0.1

IC3, SBX1981-72P

PIN NO.	VOLT (V)
1	5.1
2	0.0
3	5.1

IC4, KS24C041I

PIN NO.	VOLT (V)
1~4	0.0
5~6	5.1
7	0.0
8	5.1

IC301, TB1240AN

PIN NO.	VOLT (V)
1	3.1
2	4.1
3	8.8
4	5.0
5	0.0
6	0.9
7	1.9
8	4.0
9	4.1
10	2.0
11	3.0
12	0.0
13	0.1
14~16	2.7

IC301, TB1240AN

PIN NO.	VOLT (V)
17	9.0
18	3.0
19	2.9
20	2.8
21	5.9
22	4.1
23	4.8
24	0.7
25	1.8
26	5.0
27	5.0
28	9.2
29	3.5
30	1.4
31	4.6
32	2.0
33	0.0
34	1.2
35	3.6
36	4.9
37	2.6
38	2.6
39	2.9
40	7.1
41	0.7
42	0.0
43	2.9
44	2.3
45	0.2
46	5.0
47	3.5
48	4.5
49	0.0
50	7.9
51	7.9
52	8.8
53	4.5
54	5.6
55	3.5
56	4.4

IC302, TA1275AZ

PIN NO.	VOLT (V)
1	2.9
2	2.1
3~6	2.6
7	2.1
8	2.6
9	5.1
10	2.6
11	0.0
12	2.7
13	4.4
14	2.5
15	2.9
16	0.0
17	0.7
18	5.1
19	2.7
20	2.5
21	3.5

IC401, MM1454XD

PIN NO.	VOLT (V)
1~2	4.3
3	4.9
4	0.3
5~7	4.3
8	0.2
9~13	4.3
14	5.0
15	4.3
16	9.2

IC402, NJM2150

PIN NO.	VOLT (V)
1~7	4.7
8~11	0.2
12	9.1
13~20	4.7

IC403, M62420SP

PIN NO.	VOLT (V)
1	4.7
2~3	4.6
4	4.7
5~6	4.4
7	4.7
8	0.2
9~10	5.2
11~12	5.3
13	0.2
14	4.7
15	4.4
16	4.4
17	4.7
18~19	4.6
20	9.1

IC404, LA6458SLL

PIN NO.	VOLT (V)
1	9.1
2-4	4.7
5	0.2
6~8	4.7
9	9.1

IC409, MM1124B

PIN NO.	VOLT (V)
1~2	4.7
3	4.6
4~6	4.7
7	0.8
8	0.2
9	0.3
10	0.0
11	4.7
12	4.6
13	4.7
14	4.6
15	4.7
16	9.1

IC410, AN5277

PIN NO.	VOLT (V)
1	0.0
2	0.2
3	23.1
4~5	0.2
6	0.0
7	11.4
8	0.8
9	0.0
10	24.3
11	11.1
12	11.6

IC501, LA7832

PIN NO.	VOLT (V)
1	1.9
2	24.0
3	0.6
4	0.7
5	24.4
6	13.7
7	0.0

IC801, STR-F6656

PIN NO.	VOLT (V)
1	0.2
2	0.0
3	295.0
4	15.7
5	0.0

IC802, NJM7805FA

PIN NO.	VOLT (V)
1	11.3
2	0.0
3	5.1

IC803, NJM7809FA

PIN NO.	VOLT (V)
1	11.7
2	0.0
3	9.0

IC804, NJM7805FA

PIN NO.	VOLT (V)
1	9.0
2	0.0
3	5.1

IC901, TC4052BP

PIN NO.	VOLT (V)
1	0.0
2	0.1
3~4	2.2
5	0.1
6~8	0.0
9~10	6.6
11~15	0.0
16	9.1

IC902, TC4052BP

PIN NO.	VOLT (V)
1~2	0.0
3~4	4.1
5	5.0
6~8	0.0
9~10	6.6
11	4.1
12	0.0
13	4.1
14	5.0
15	0.0
16	9.1



# WAVEFORM

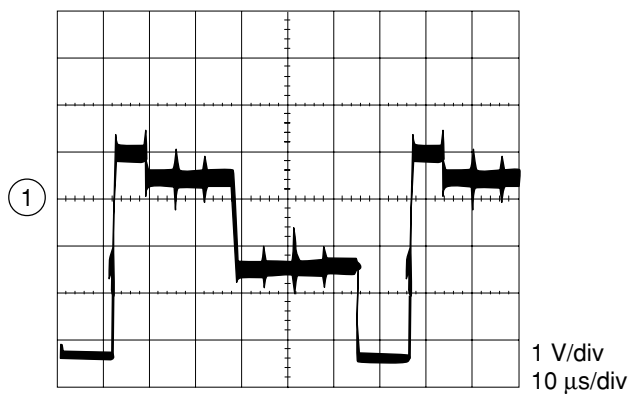
AC : 220V

INPUT : TUNER PAL-COLOR BAR AUDIO 1kHz

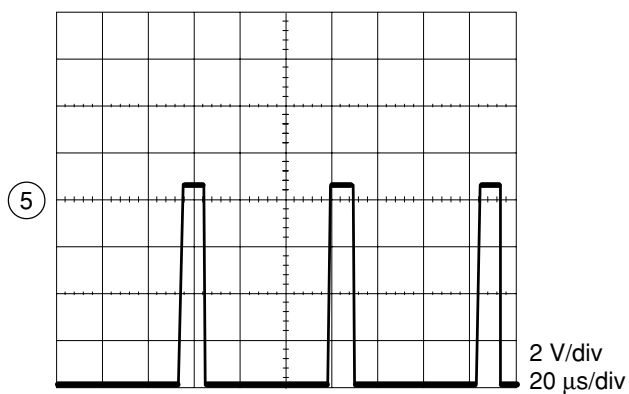
USER CONTROL : ALL RESET

MAIN C.B

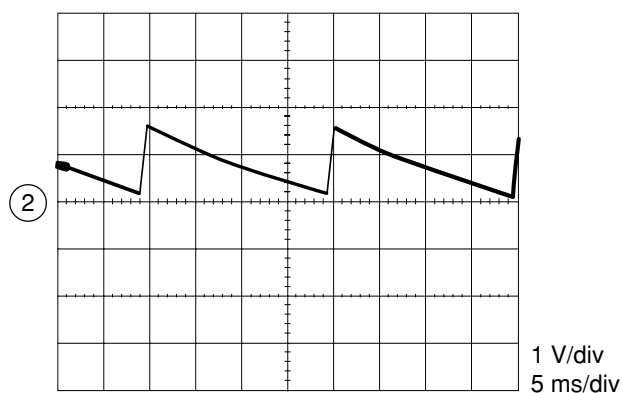
① IC301 PIN 19 (GOUT)



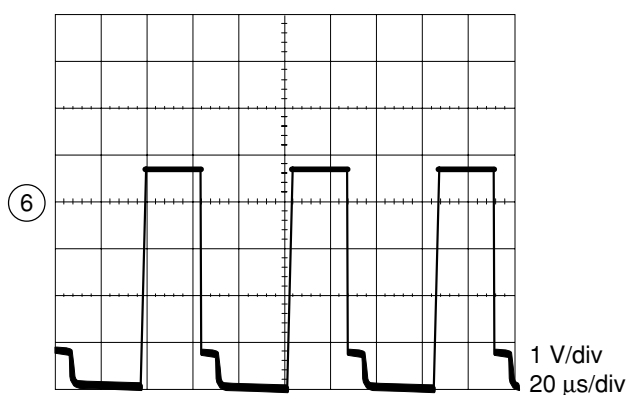
⑤ IC301 PIN 30 (FBP IN)



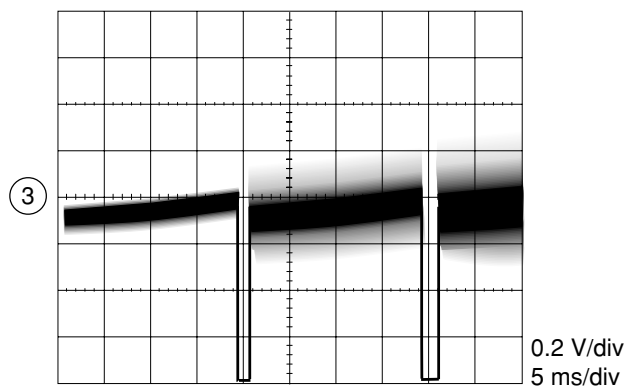
② IC301 PIN 23 (V NFB)



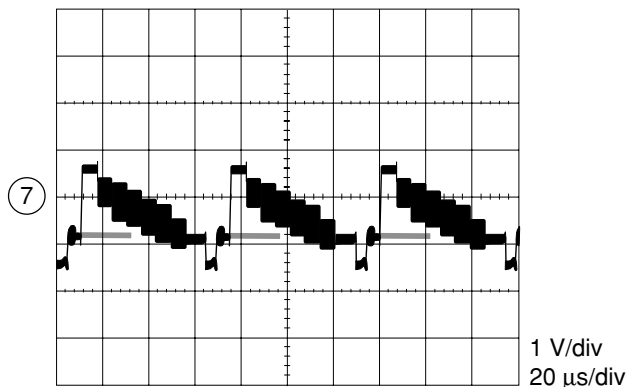
⑥ IC301 PIN 32 (H OUT)



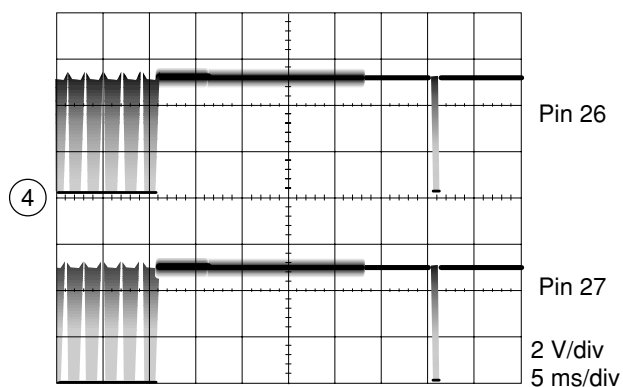
③ IC301 PIN 24 (VOUT)



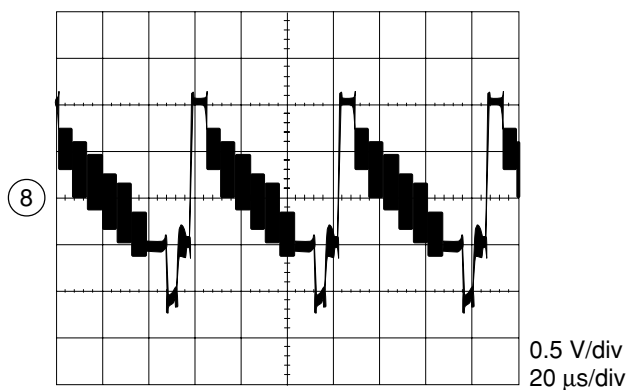
⑦ IC301 PIN 47 (IF DET OUT)



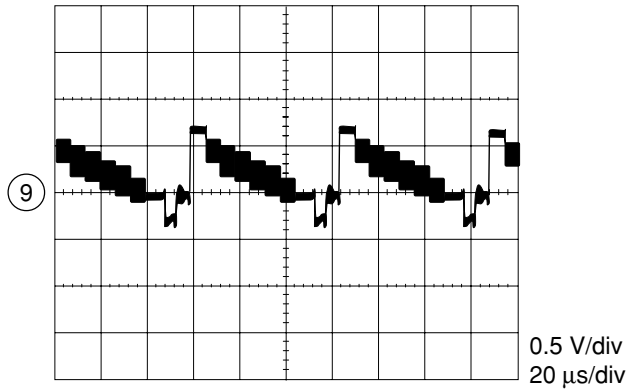
④ IC301 PIN 26/27 (SCL/SDA)



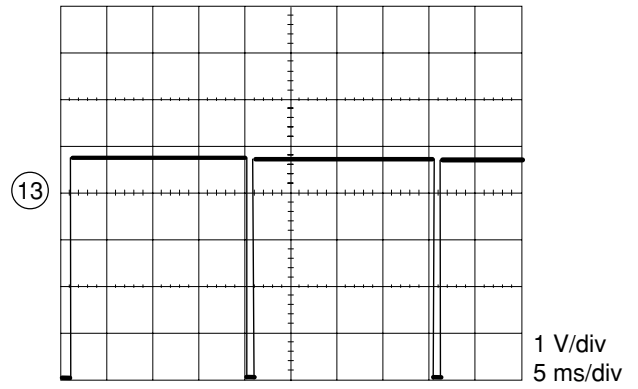
⑧ Q912 EMITTER



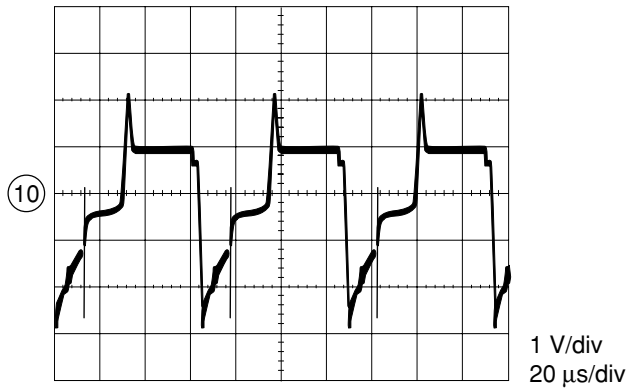
⑨ Q910 BASE



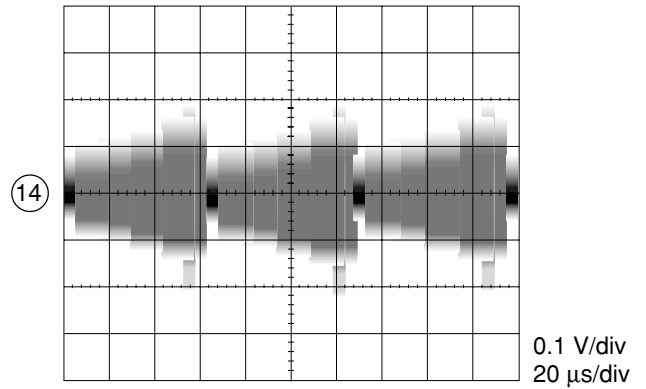
⑬ IC1 PIN27 ( $\overline{VD}$ )



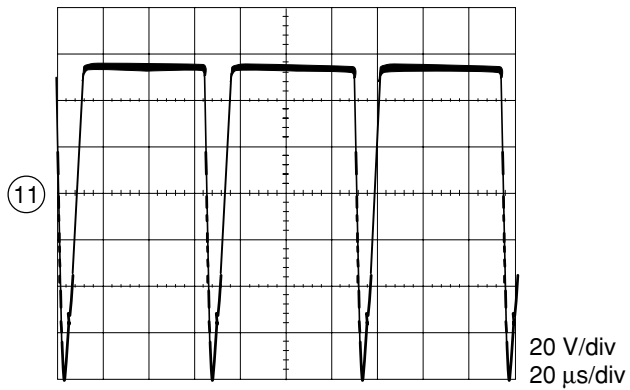
⑩ Q601 BASE



⑭ Q101 COLLECTOR

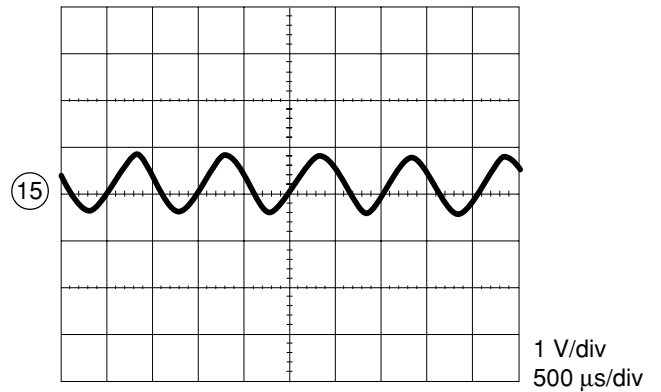


⑪ T601 PIN 1 (COLLECTOR)

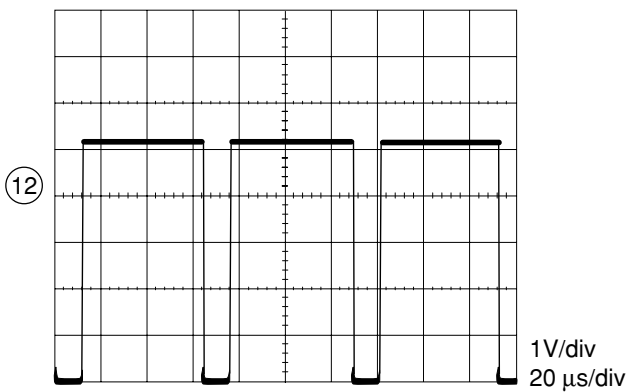


AUDIO C.B

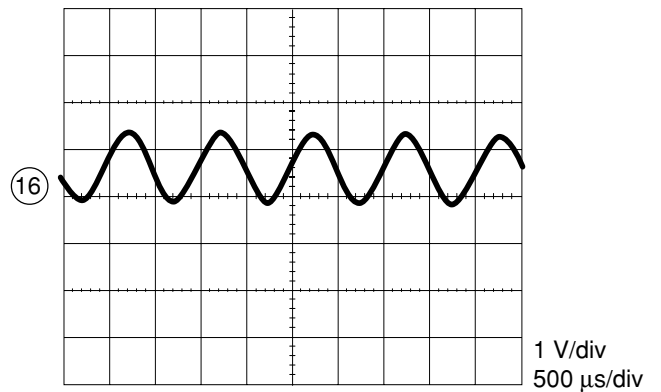
⑮ IC401 PIN 1 (RIN)



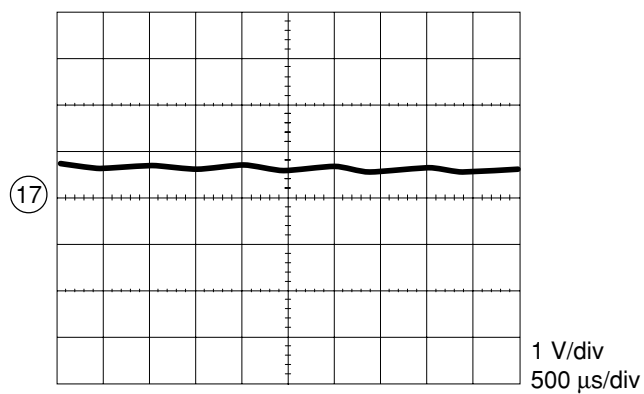
⑫ IC1 PIN 26 ( $\overline{HD}$ )



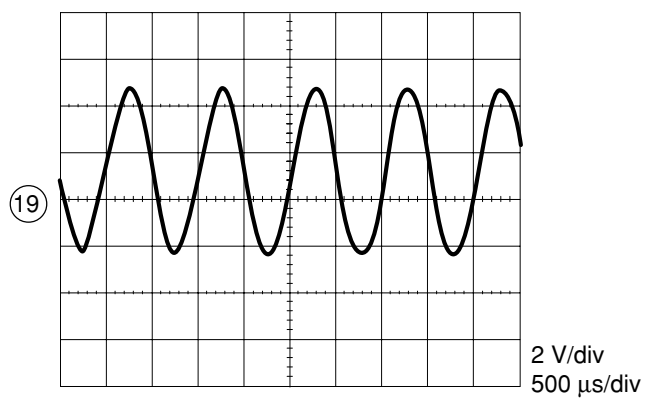
⑯ IC402 PIN 7 (OUTPUT (A))



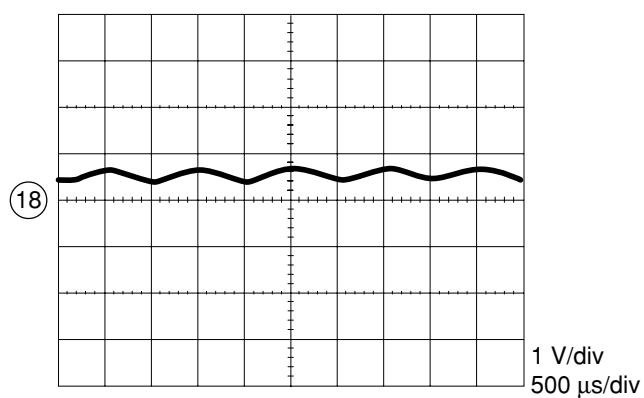
①⑦ IC403 PIN 14 (OUT2)



①⑨ IC410 PIN 7 (CH2 OUT)

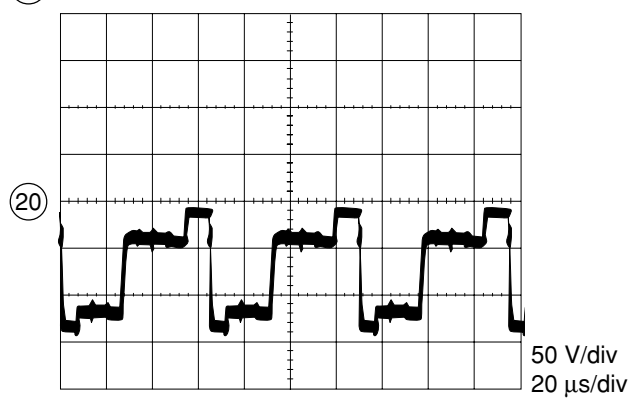


①⑧ IC409 PIN 15 (IN2)

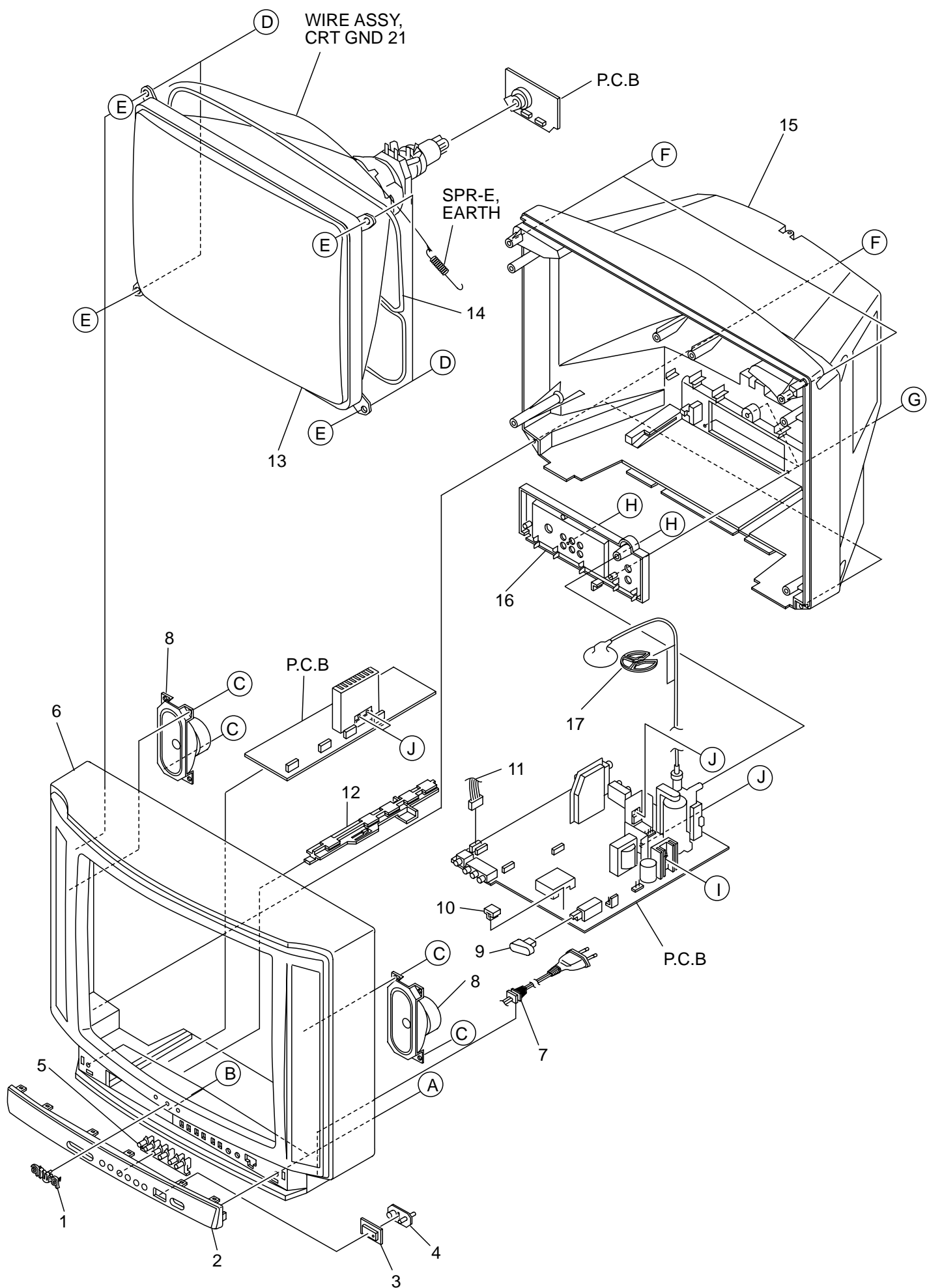


NK C.B

②⑩ Q552 COLLECTOR



# MECHANICAL EXPLODED VIEW 1 / 1



## MECHANICAL PARTS LIST 1 / 1

REF. NO.	PART NO.	KANRI NO.	DESCRIPTION
	1	87-054-087-010	BADGE, AIWA 40
	2	8A-JBK-002-010	PANEL, MAIN A2115
	3	8Z-JBR-005-010	LENS, RC
	4	8Z-JBR-006-010	LENS, LED
	5	8Z-JBR-004-010	KEY, MAIN
△	6	8A-JBG-001-010	CABI, FR BL
	7	8Z-JB4-695-010	AC CORD SET, EH BLK
	8	8Z-JB4-620-010	SPKR, 6*12 8OHM 10W
	9	8Z-JB5-007-010	BTN, POWER SH
	10	84-LB3-216-010	HLDL, LED
△	11	8Z-JBX-602-010	CONN ASSY, 4P SP 205-0.5
	12	8Z-JBR-201-010	HLDL, PCB 1
△	13	86-LB2-603-010	CRT, A51LMV10X06N00
	14	87-JBN-630-010	DGC, 21PAL 7JB-22
	15	8Z-JBR-012-010	CABI, REAR N
	16	8Z-JB5-010-010	PANEL, REAR SH
	17	87-A90-332-010	HLDL, SF-2001 HV CABLE
A	87-067-680-010	BVI T3+3-10	
B	87-067-758-010	BVT2+3-12 W/O SLOT	
C	87-078-070-010	BVIT3B+4-12	
	D	86-LBB-206-010	S-SCREW, ASSY TV5-40 W20
	E	8Z-JBS-204-010	W-PVC, 10-20-1
	F	87-067-844-010	BVT2+4-16 BLK
	G	87-067-690-010	TAPPING SCREW, BVIT3+3-12
	H	87-067-761-010	TAPPING SCREW, BVT2+3-10
	I	87-B10-090-010	BVIT3B+3-12 GOLD
	J	87-067-579-010	TAPPING SCREW, BVT2+3-8

## COLOR NAME TABLE

Basic color symbol	Color	Basic color symbol	Color	Basic color symbol	Color
B	Black	C	Cream	D	Orange
G	Green	H	Gray	L	Blue
LT	Transparent Blue	N	Gold	P	Pink
R	Red	S	Silver	ST	Titan Silver
T	Brown	V	Violet	W	White
WT	Transparent White	Y	Yellow	YT	Transparent Yellow
LM	Metallic Blue	LL	Light Blue	GT	Transparent Green
LD	Dark Blue	DT	Transparent Orange	GM	Metallic Green
YM	Metallic Yellow	DM	Metallic Orange		

アイワ株式会社 〒110-8710 東京都台東区池之端1-2-11 ☎03(3827)3111 (代表)  
**AIWA CO.,LTD.** 2-11, IKENOHATA 1-CHOME, TAITO-KU, TOKYO 110, JAPAN TEL:03 (3827) 3111